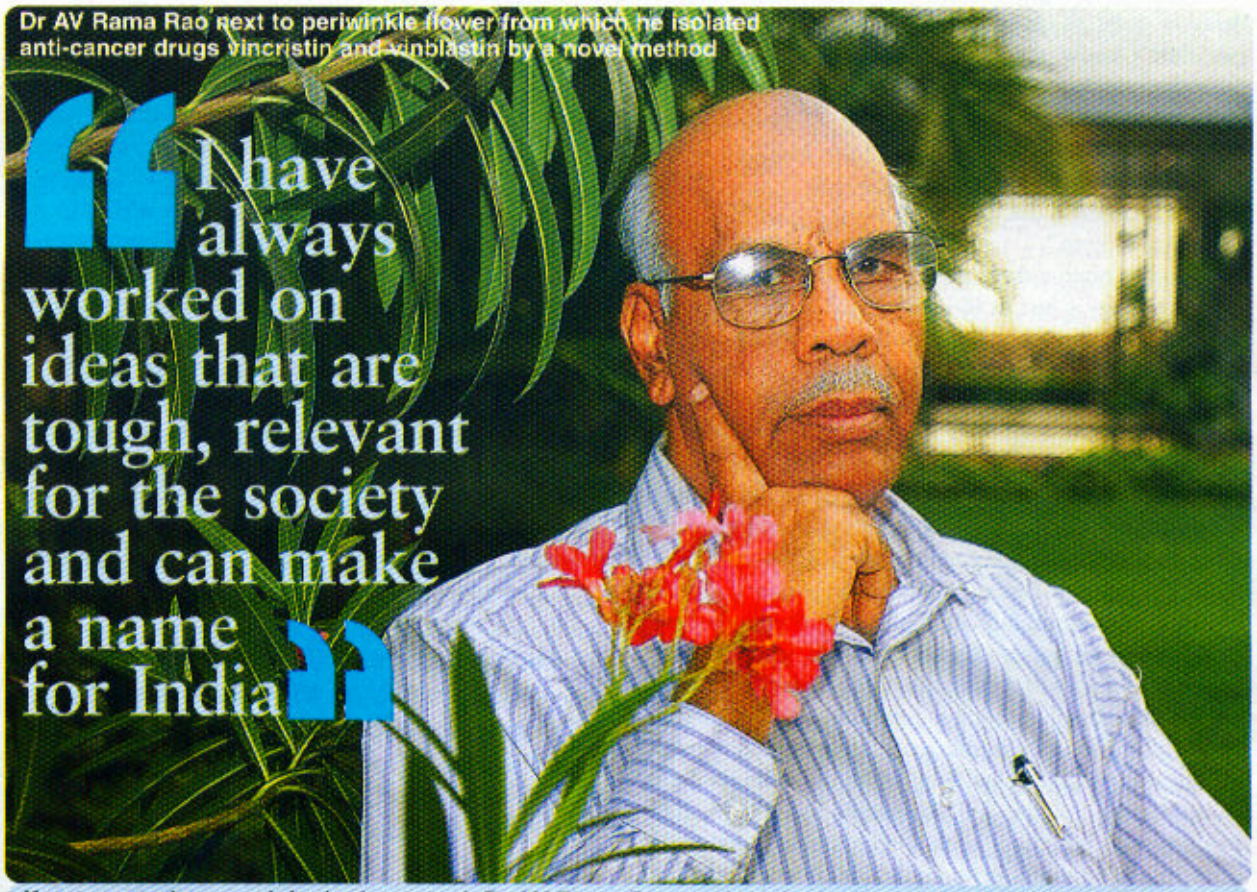


Dr AV Rama Rao next to periwinkle flower from which he isolated anti-cancer drugs vincristin and vinblastin by a novel method

If outsourced research is the buzzword, Dr AV Rama Rao ought to be its icon. He runs India's only scientific research lab as a business venture. His company Avra Laboratories provides technical services, process technologies and synthesis of new chemical entities for world's leading drug companies like GD Searle, Pfizer and Bristol-Myers Squibb. From extremely humble origins of rural Andhra Pradesh, Dr Rama Rao became an innovative scientist with National Chemical Laboratory in Pune and later turned the Indian Institute of Chemical Technology into a centre of excellence. His outstanding research work has led to 30 patents, 50 drug technologies for the industry and 109 PhDs. While his outspoken and straightforward nature has upset a few mediocre people, Dr Rama Rao has had a long friendship with Dr YK Hamied of Cipla, synthesising the anti-AIDS drug that fetched global fame for Cipla and Dr Hamied. Excerpts from Dr Rama Rao's interview with MoneyLIFE editors Sucheta Dalal and Debashis Basu at his lab in Hyderabad.

ML: Can you tell us a little about your background and your childhood?

AVR: I have seen your other interviews where everybody seems to be a topper. Let me be very frank. I was never a topper in school. My father was a state government employee who got transferred frequently. I was the first child and used to move around with my parents. Usually, by the time I finished half a year, my father was transferred and I often didn't go to school in the second half at all. I was happy spending most of my time playing. Then, I scraped through the sixth standard and got into the high school.

Since my father used to get transferred frequently, I often stayed with my grandparents at Guntur. But when I was in my fourth standard, I had a friend who played cards. Now, in Andhra Pradesh, everybody has three 'virtues' -- playing cards, drinking and womanising. We used to bunk school in the afternoon and play cards behind a temple. I somehow got through the exams because I had a terrific memory.

ML: When did you get serious about studies?

AVR: The year I was supposed to appear for my SSC, I realised what I was doing. By then, I was sent to live with my aunt who was very poor. My father used to send Rs40 every month for my upkeep and they managed the house with that money. It made me realise, for the first time, that if I did not have proper education, I have had it. We used to have just one meal and

leftovers in the evening.

ML: How did this realisation change you?

AVR: I used to dominate everything that I did. I was not a great football player, but I was the team leader. I also realised, for the first time during my SSC exams, that scoring marks is not difficult and I topped my school. At that time, my father used to say that he would get me a clerk's job when I pass my SSC.

Because I didn't study regularly, I had become weak in mathematics and I opted for biology, physics and chemistry at the intermediate level but didn't know that students with biology went on to do medicine. I casually applied to a medical college in Guntur where only 13 of the 50 seats were for merit students. I ranked 14th or 15th. My father could not afford to send me outside Guntur. So, although Vishakapatnam (medical college) had more seats, I could not go. I didn't feel bad. I had, by then, started liking chemistry, so I joined AC College in Guntur for my BSc. Getting a first class was a big thing those days and I was a topper. I was also the college student leader. Our principal believed that student leaders are rogues and don't study. So whenever he got complaints from the faculty, he always called for my marks. I used to get away with a warning, since I was a topper. One had to go out of the state for a Master's degree those days and most people went to the Benaras Hindu University. Since we were nine siblings, there was no money for me to go. My father had asked me to apply for the post of a clerk and I got the job, but I was reluctant to join.

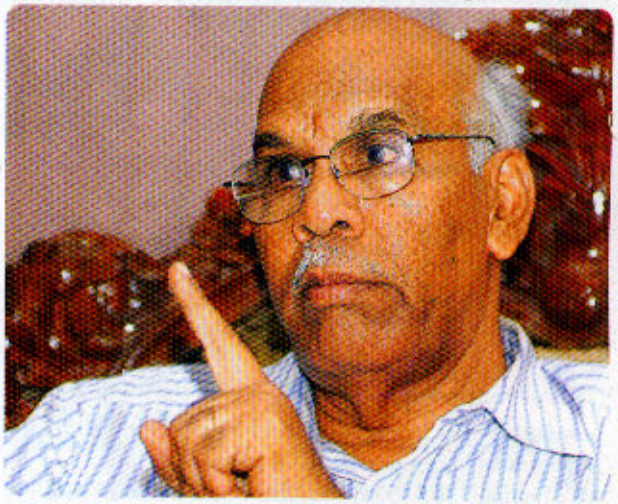
ML: What did you want to do?

AVR: I wanted to study more. But I knew the family situation, so I decided to join AC College as a chemistry demonstrator for one or two years. Those days, post-graduates applied for the demonstrator's job, but sometimes they took graduates too. The evening before the interview, I went to meet the Head of the Department (HOD) hoping he would put in a good word for me. He did the opposite. He said, "You are a student leader and don't deserve to be a teacher". Anyway, I got the job. A year later, I was selected as a chemist in the Agricultural College at Bapatla. It is there that I realised that a BSc was not enough and told my father that I wanted to study further. I saw an advertisement of the University Department of Chemical Technology, Bombay. I applied and got through. I landed in Bombay on a rainy day like Sharma (Prof MM Sharma, see interview in *MoneyLIFE* 7th December issue). I didn't know the city and someone on the train asked me to get off at Dadar. I took a taxi, which took me to VJTI and dumped me there. I then walked in the rain to the hostel. That is how I started.

I wanted to do pure chemistry and not engineering. Those days, Prof K Venkataraman was the best in organic chemistry. He was at the National Chemical Laboratories (NCL), Pune. I applied to do my PhD under him, even though many students took 8-10 years to complete their PhD with him. I was also getting job offers from companies like Glaxo and Pfizer. Nobody other than me went for research from my batch.

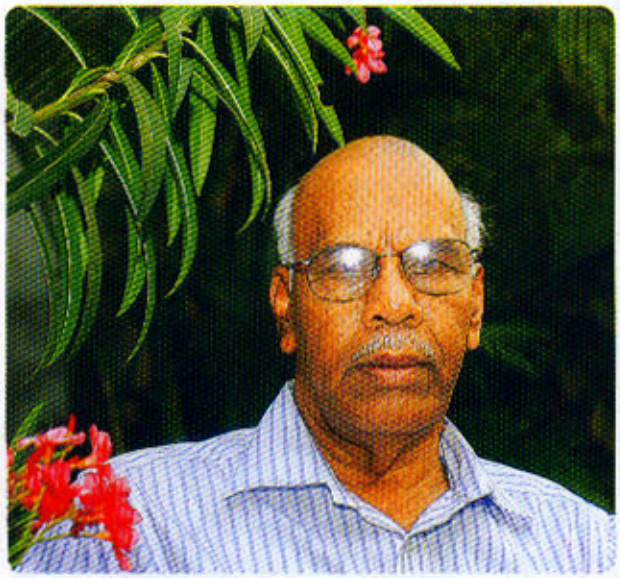
ML: Did you know Prof Venkataraman earlier?

AVR: No, I didn't; but he was a former faculty member of UDCT and had a soft spot for UDCT students. For the first three months, when there was no fellowship, I had to plead with my father for support and he sent me Rs100 a month for expenses. I completed my PhD in a record time of three and a half years and Prof Venkataraman asked me to stay on for post-doctoral work. After a year, I wanted to leave NCL for further studies. He insisted that I stay back. I told him that he should at least give me a



> "During my high school, I was sent to live with my aunt who was very poor. My father used to send Rs40 every month for my upkeep and they managed the house with that money. We used to have just one meal and leftovers in the evening. It made me realise, for the first time, that if I did not have proper education, I have had it"

regular position. I became a 'Scientist B' at NCL in 1965. Until then, everyone was appointed to this post only on returning from abroad after higher studies. I was already married and had a child. A permanent government job seemed like a God-given gift. For the next 10 years, I was focused on chemistry of natural products and isolated 100



"In early 1972, I went to meet a trader in Bombay. He took me to Dr YK Hamied, then the director of R&D at Cipla. He was trying to set up a bulk drug unit. He enquired about my work and I explained my approach to synthesising a particular product. He wanted to buy the know-how. A few days later, he came to NCL and paid a one-time fee of Rs30,000 to buy the process. We were amazed"

new compounds from plants and insects, which led to 70 publications in top international journals.

ML: During 1965-1975, you also worked closely with industry, shifting from your desire to do only fundamental research.

AVR: I had the notion that fundamental research was the pure thing and industrial research was mediocre. But NCL was changing at that time. Director Dr BD Tilak insisted that fundamental research had no relevance and the organic chemistry division had to find ways to serve industry. My first brush with industrial research was the case of Poona Synthetics in 1970. The owner, Maharaj Singh, was the son-in-law of LK Jha (then Reserve Bank Governor). Jha had requested Venkataraman to help the company solve a problem. But Venkataraman didn't know anything about it so he asked me to help. The company was making OTS-amide, a key intermediate for saccharine, and in the process it threw away a by-product called PTS-amide. Saccharine prices went down and Poona Synthetics was making heavy losses. I felt that the only way to revive the company was to add value to PTS-amide by converting it into an intermediate called urethane, for an anti-diabetic drug. Hoechst India was a possible buyer. But Singh felt that Hoechst would never accept a local product. He was right.

ML: That was very surprising. Arrogance of MNCs?

AVR: Right. Hoechst simply threw out the managers of Poona Synthetics. I bought a ticket to Bombay on my own and went to Hoechst. I didn't even have a business card and wrote 'from NCL' on a piece of paper. The Hoechst manager was also a former student of Venkataraman and called me in. He knew my name and agreed to give me only one trial. He gave us an order for Rs two lakh immediately. But the company had no money to execute it. So, I approached State Bank of India which asked me for a technical guarantee. The manager said: "I will give money only on your word". I took an NCL letterhead, wrote that the product would work and signed it. Later, I came to know that we are not supposed to do such things. I used to do some daring things but only with good intentions.

ML: You were involved in supervising the production too.

AVR: I had to design the plant needed to produce urethane and I was also spending Saturdays and Sundays supervising the product batches in the factory 20km away from Pune. Within one year, the company was out of the red. In fact, I found another application for PTS-amide -- fluorescent pigments which were being imported.

ML: After that, you got involved with the drug industry.

AVR: Around 1972, I was keen to start a programme on synthetic drugs. Indian patent laws had been changed to allow Indian versions of foreign drugs and pesticides. I selected the product diazepam but Regional Research Laboratory (RRL), Hyderabad, was already doing it for Ranbaxy. I told Dr Tilak that my approach would be different and it would work out much cheaper. But we had problems getting the raw materials, which were imported. In early 1972, I went to meet a trader in Bombay. He took me to Dr YK Hamied, then the director of R&D at Cipla. He was trying to set up a bulk drug unit. He enquired about my work and I explained my approach to synthesising a particular product. He wanted to buy the know-how. A few days later, he came to NCL and paid a one-time fee of Rs30,000 to buy the process. We were amazed. Later, we completed the synthesis of diazepam which was given to Centaur Chemicals.

ML: What was your next career move?

AVR: I felt the need to spend one or two years at one of the best organic labs. In 1975, I landed up at Harvard working with EJ Corey (a Nobel Laureate). Somebody had initially recommended my name to Har Gobind

Khorana, who was at MIT. But Khorana was working more on biological chemistry rather than pure organic. So I opted for Harvard. After two years, I was very keen to come back because I was well established here and wanted to continue my fundamental and industrial research.

ML: What did you do after you returned from Harvard in 1977?

AVR: When I returned, I was very ambitious and wanted to work on tough molecules, especially relating to cancer. Dr Tilak told me: "Don't think you alone have come from Harvard with an ambition. I too have worked with Dr Woodward at Harvard. Forget all your ambitions and goals and go back and work on natural products". But I was adamant. He said: "In that case, you should get outside funds". Then, I met Dr Hamied. He knew I had really good potential. He offered me a job. He said he would build an R&D lab in Bangalore. He gave a blank cheque to sign for my salary. I said: "No, I did not go to Harvard for nothing; I wanted to be in research". He said: "I will give you 10 research fellows to work with you". I said: "Once one enters the industry, research becomes secondary. For me, research is a primary commitment". He suggested that I become a consultant. I have been a consultant to every major pharma company -- Ranbaxy, Cipla, Lupin -- at some or time or the other. But Dr Hamied was a regular. He used to sponsor all kinds of projects, so money was never a problem later.

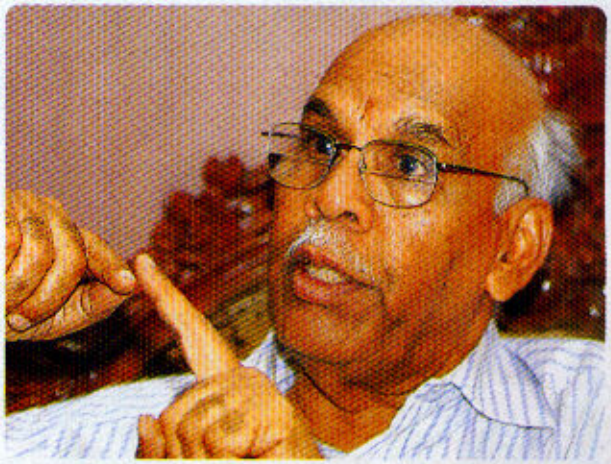
ML: Around that time, you made a major breakthrough in cancer treatment.

AVR: While I was looking for outside sources of money, somebody told me very casually that the Maharashtra Government has a small grant in what they called a Science & Technology Cell and that they may provide funds for one of my projects. The head of the Cell was one Dr Malshe. Unknown to me at that time, he was suffering from cancer and was reading a lot on anti-cancer research and medicine. He wanted to work on anti-cancer medication and had probably read about my work on vinblastine and vincristine at the Corey group (at Harvard). In the 1960s, Eli Lilly came to India and did research on some Indian plants based on the ayurvedic system as part of the collaboration with NCL for plant extraction.

They had picked up this plant -- the Vinca rosea -- which is traditionally known to have medicinal properties. The plant grows anywhere. It doesn't need watering and strangely no animal touches the plant. Even plant virus doesn't affect it. The reason, as we now know, is that it contains powerful alkaloids, which give out a pungent smell. Do you know that women do not offer this flower to God? Nobody knows why, but nobody plucks this flower, although it grows in the wild. The Malayalis make a decoction by boiling dried leaves in water and drink it. They believe it cures diabetes. On that basis, they were looking for an anti-diabetic medicine, but it was not responding in animal tests.

ML: How was it identified as a cure for cancer?

AVR: Vinca rosea affected the bone marrow and the white blood corpuscles reduced. That indicated that an anti-cancer drug was a possibility. So vinblastine and vincristine, the two dimeric alkaloids widely used as anti-cancer agents were isolated and even today are the only means of cure for leukaemia among children.

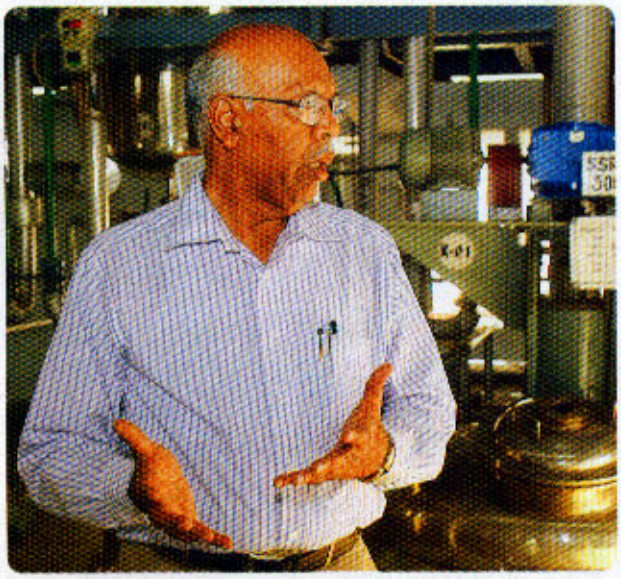


"In 1975, I went to Harvard to work with EJ Corey (a Nobel Laureate). Somebody had first recommended my name to Har Gobind Khorana, who was at MIT. But Khorana was working more on biological chemistry rather than pure organic. So I opted for Harvard"

India was the only source of dried vinca leaves. Traders were procuring it from tribals in Maharashtra and exporting them to Eli Lilly, USA. But people became greedy and started adulterating the leaves. When Eli Lilly realised this, it started cultivating the plant in the US and Africa.

In response, the Ministry of Social Welfare began to buy leaves from the tribals to support them. When exports dried up, huge stocks had piled up. They then approached the Science & Technology Cell to see if anything could be done with the leaves. That is how Dr Malshe wanted to work with this plant. He wanted Pune or Bombay University to isolate vinblastine and vincristine, but neither of them came forward.

When I met him, I began to talk about the plant and gave him more and more details. He soon realised that I knew more about it than he did. He asked me "how do you know so much about this plant"? I told him I was working on anti-cancer drugs. I told him about wanting to isolate vinblastine and vincristine. He asked me how much money I would need. I said Rs two lakh. He sanctioned it in 24 hours. Since NCL had told me there was no money for fundamental research, I went to the



> "I got drums, bought a tap with my own money and welded it to the drum. I packed 30kg of leaves in the drum; I bought solvent and that is how the technology of the anti-cancer drug was developed, using a very simple process without chromatography"

Osmania University to look for research students. I started work in 1979 to process 10 to 20kg of Vinca rosea leaves to get a 0.001 extract of vinblastine. I got drums, bought a tap with my own money and welded it to the drum. I packed 30kg of leaves in the drum; I bought solvent and that is how the entire technology was developed, using a very simple process without chromatography.

ML: This is really a fascinating story.

AVR: Yes. I informed Dr Malshe that we were able to get vinblastine. He was very excited and asked me about my other basic project for anthracyclines. I asked him if he would be willing to give money for that. His mandate was to fund state universities not central institutes, but he realised the importance of what we were doing. He said, "Dr Rama Rao, if you make vinblastine a success, then money is not a problem". He later agreed to give us another Rs three lakh. His entire budget was Rs eight lakh and he had given more than half of it to us.

I commercialised the vinblastine project and successfully completed the anthracycline programme.

ML: Why didn't anybody else think about this procedure, a simple solvent extraction method?

AVR: There are 95 alkaloids in Vinca rosea of which you have to pick one. Scientists read the literature and make things complicated. They carry on with what was done before. Maybe today I will not be able to do what I did before. Those days, I didn't have the right facilities. Pushed to a corner, you are determined to find a way out. Even on anthracycline, when I published papers, all the MNCs read my papers, because the methods were so simple. And I got invited by all the pharma companies to give lectures. All these projects were relevant to them. I am one chemist who has probably lectured at all the pharma companies and made more money from my lectures than consultancy. I used to pay more income tax than my salary.

ML: Vinblastin was an astounding breakthrough that combined both fundamental and industrial research and surely made waves at that time?

AVR: In a coincidence, the very morning I gave the sample to Dr Malshe, he had met Chief Minister AR Antulay, who was under fire from the MLAs wanting the Science & Technology cell to be wound up. Antulay was supposed to reply in the Assembly. He asked Dr Malshe "Will you get any money from this research"? He said, "We will get royalty, but more than that, it is a product that will put India on the world map".

Now, I had not discovered the drug. What I did was to discover a new technology to lower the price of making the key intermediate. But Antulay, being a politician, did not understand the difference and went ahead and announced that an Indian scientist had discovered an anti-cancer drug. It was reported on the front pages of all the newspapers the next day; but the text we had given him was accurate.

ML: What about the next steps -- establishing the efficacy and actual manufacturing of the drug?

AVR: Our process of isolating vinblastine and vincristine was superior to what Eli Lilly was doing. But who was going to exploit it in India? Hindustan Antibiotics was supposed to make the product. It insisted on using vials. The authorities wanted me to demonstrate the efficacy of the product. That is where Dr Hamied helped. He put me in touch with Tata Cancer Hospital. There was one Dr Shetty who was the chemotherapy head. I spent my own money visiting the Hospital. Hindustan Antibiotics

had a machine which was unused. I cleaned it up and used it to make vials for tests. We used the drug on the Tata Hospital patients, along with the Eli Lilly products and Dr Shetty concluded that the results were identical to the Eli Lilly product. But HAL refused to make them. I went to Dr Hamied and asked him if he would manufacture the drug. He said, 'No. Rama Rao, you are a good scientist, but you have to learn business from me'. I was surprised. I thought I had done something fantastic. He asked me what is the total sale of the drug in India? It was Rs25 lakh. He said, "My investment would be Rs two crore plus two years of interest which would then have amounted to Rs40 lakh". It made no sense and I had no real answer for this.

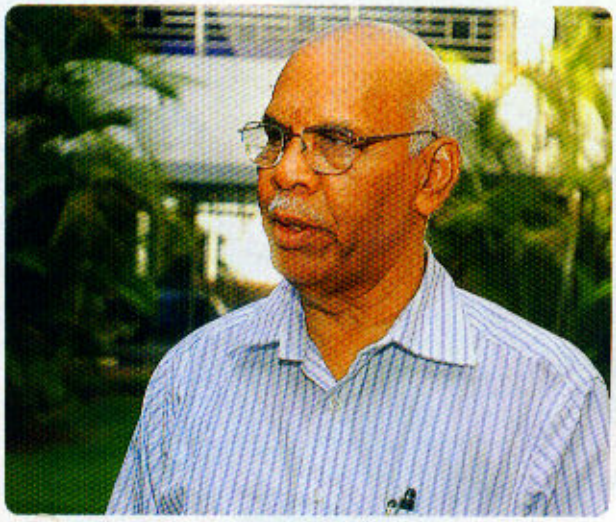
ML: Was there an export possibility?

AVR: Those days, nobody thought about the world market. Cipla's exports were only Rs1.5 crore. So I used to sit in the library, late into the night and wonder what is going wrong for this kind of innovation. Then, I suddenly discovered that the patent for the Eli Lilly product was due to expire in 1985. I called Dr Hamied the next morning and said, "It is a world market -- the patent is going to expire in 1985 and we are already in 1982. We need two years to start production and you need regulatory permissions". He said, "My God, Rama Rao, I didn't realise this". Cipla's Bangalore facility was created. That was the beginning of exports by the Indian drug industry. That is how Cipla also moved very fast and I became well-known. Cipla signed the agreement for technology in 1983 and supplied the first 500 vials to three major cancer hospitals in December 1983. It sold each vial of vincristine sulphate at Rs25 compared to the imported price of Rs80.

Through the entire process I learnt not only technology and formulation but dealing with the doctors, clinical trials, dealing with FDA rules, good manufacturing practices (GMP) and exports. That's why my own venture Avra Laboratories has the Vinca rosea (the Periwinkle flower) as its logo. The whole thing opened up my mind. Even today, no scientist knows all these aspects from fundamental research to commercialisation. You need extreme commitment to get solutions. Today, there are specialised people in industry to take care of different phases of the process; but at that time, there was no one.

ML: You worked on other projects with Cipla and Lupin. What was the next big piece of your work?

AVR: Another area where I think I made some contribution to the country is in HIV/AIDS. I have a knack for identifying the right products -- it is a God-given gift -- through mundane sources. There is another aspect -- in science, everybody becomes expert in one



> "In science, everybody becomes expert in one chosen field; they rarely change track and do something different. But every five years, I changed my area of work - from anti-cancer to cyclical peptides to AIDS"

chosen field; they rarely change track and do something different. But every five years, I changed my area of work.

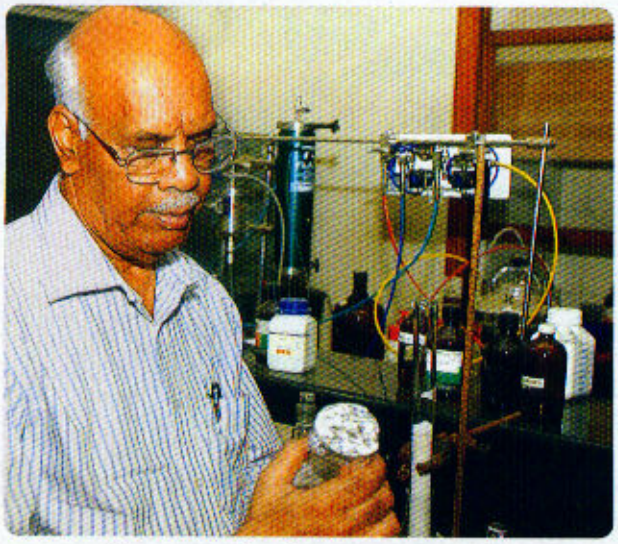
ML: Tell us about each of these phases.

AVR: When I returned from Harvard, I was into anti-cancer research. Then, in 1985, I decided I must change track and was looking for new areas. MG Ramachandran was the chief minister of Tamil Nadu and had undergone kidney transplant. One morning, while reading the newspaper, I noticed that the opposition parties were asking who had paid for it -- the party or the state government. He needed to take Cyclosporine A, which is a drug given to organ transplant patients and has to be taken lifelong. The cost was Rs50,000 per person per year. I wondered why does this drug cost so much and why can't it be made here.

I rushed to the library and started looking up Cyclosporine A. I found it was an immunosuppressant. I had never worked on this. So I went to the laboratory and wrote on the board - immunosuppressant. This is the project we are going to work on. My researchers were very reluctant because they knew nothing about it. I said, we will read and learn. To work in this area, we had to do asymmetric synthesis. This was done for the first time in India. Then there is a compound which is 100 times more powerful than Cyclosporine, which is given today to heart transplant patients. We did the total synthesis for the first time outside the US. We worked on this till 1990-91.

From 1980 to 1995 was the period when I worked on my own and the way I wanted to. Since I had made a name in research, money was pouring in from industry and I utilised it for fundamental research.

I used to have a large number of student groups. I had supervised 109 PhDs over 15 years. I used to tell them to go and sit in the library and get me some new ideas. The ideas should be for something that is tough, relevant to society and get us name and fame. These were the three criteria. One day, I was looking at vancomycin which is used when all antibiotics fail. It is a very complex molecule. It is most fascinating structure-wise and activity-wise. I knew that if we could do something with it, we will be noticed. We worked on it from 1992-95. Guess who was our competitor? A Harvard professor. He had been working on it for 10 years. Everyone said he is working on it for a long time and couldn't get anywhere, so why did we want to get into it.



> "Vancomycin is a very complex molecule. I knew that if we could do something with it, we will be noticed. We worked on it from 1992-95. Guess who was our competitor? A Harvard professor. He had been working on it for 10 years. We beat him to it"

ML: The product was already there. You wanted to make a new analogue for better results?

AVR: Yes. It is like, why did you climb the Everest? It is for the excitement. Here, there was not only excitement but the work has relevance. Industry takes your work, makes a variety of analogues. Even for vincomycin, there are hundreds of new analogues. It was a fermentation product made by Eli Lilly. We were the first to synthesise it. We aimed to extend its knowledge and efficacy. We made it in two halves. Then a problem arose. How to hook the two halves together. That was the problem the Harvard professor was struggling with. I go for morning walks and, at that time, I think about all my problems. One day, while walking, it suddenly occurred to me that this may not be the way Nature has built it. So I came back and said, let us reverse the sequence; we were the first to complete the synthesis.

ML: You have also worked on AIDS medicine.

AVR: In 1988-89, I read in a newspaper that a young man had come from the Gulf and died of AIDS because of blood transfusion. There was only one drug available for AIDS which had responded in animal testing. The USFDA had approved it without any clinical trials, bypassing all the rules. It was very expensive. I deeply felt that every Indian must have access to it. We came out with a new method of making the drug. I requested Dr Hamied to commercialise it in 1991. I said, "Please make at least a small amount for the Indian market, otherwise our people will be deprived". He was reluctant but agreed. At that time, Burroughs Wellcome had introduced the drug in India and wanted to block our product. The Indian FDA wanted the drug tested on eight HIV patients, but there weren't that many patients in Indian hospitals. This meant that it was impossible to meet the requirement. One year passed and it was not cleared. In 1992, Dr Hamied said, "I have done what you wanted; it is not in my hands, because this man is not moving the file".

I then picked up the phone and called the officer. I knew the person because he was on various government committees that I headed. For the first time in my life, I threatened someone. I said, "If you don't clear the drug within 24 hours, I will take up the issue with the prime minister, who is the president of CSIR". It was cleared in 24 hours. Cipla manufactured about 10 million tablets of zidovudine, but there were no patients. Dr Hamied said he was willing to distribute it through the ICMR (Indian Council for Medical Research), but the director of ICMR said that was not his mandate. By 1995, however, AIDS had become widespread and the market for the drug just took off.

ML: Cipla has made such a global name by offering the drug at a much lower price than MNCs.

AVR: Yes. Clinton came and visited the Cipla factory -- the Clinton Foundation buys the drug even today.

Dr Hamied really encashed on the drug and even got the Padma Bhushan. All this was mainly because of my initial pressure and he acknowledges it wherever he talks about

AIDS. We share a deep bond.

ML: You moved from NCL to IICT (Indian Institute of Chemical Technology) at Hyderabad in 1985 where you transformed that organisation.

AVR: We used to consider the Regional Research Laboratory (as IICT was earlier known) as a junk lab. The post of the director was vacant and Prof MM Sharma was chairman of the selection committee. He used his prerogative to invite me for the position. So, Dr S Vardarajan, who was the director general of CSIR, spoke to Dr LK Doraiswamy at NCL to release me. But I was making a lot of money for NCL. So Dr Doraiswamy wanted me to refuse the post. For the actual selection, however, Dr Vardarajan had recommended another candidate. The ultimate decision was that of the prime minister and I learn that Rajiv Gandhi decided in my favour on the recommendation of Shivraj Patil, who was the Science & Technology minister. Mr Patil had occasion to see my work and spend some time with me earlier. Initially, I was reluctant to go to Hyderabad, so was my wife. But I told her three things: one, it is an opportunity to turn the place around, while at NCL there were at least three people who were director material; two, we are from Andhra and it may be a better place to settle down after retirement; three, if I fail, I will be able do something on my own. I will not seek a job. I came to RRL, the junk lab, in 1985. By 1990, we were the number one, based on CSIR's yardsticks. In 1988, they initiated the young scientist's award. Over the next seven years, we won it six times. We won all the technology awards. In 1990, they initiated a business development cash award of Rs one lakh. Dr Mashelkar was heading NCL at that time, but they didn't even apply because they felt we would get it. There was only one application -- from IICT.

ML: Why do people say that you are too outspoken?

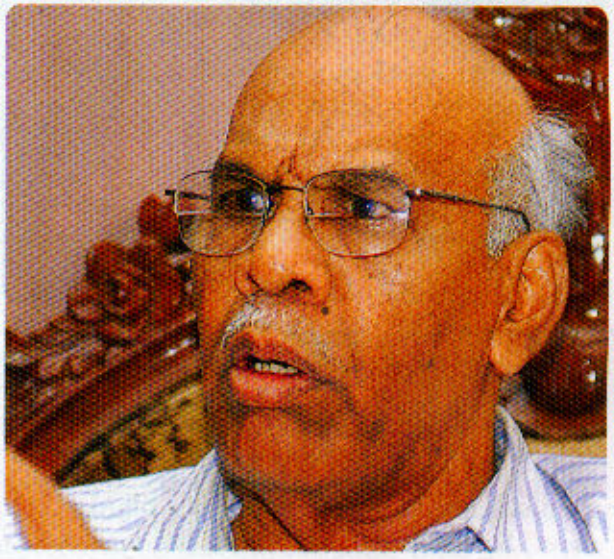
AVR: That is because if someone is doing something wrong, others keep quiet. I don't. Also, I fight for the right. None of my fights is for my personal benefit. When I came to IICT, there were unions and I had to remove the troublemakers, which meant fighting the politicians. If you remove one person, it causes a controversy; I had removed 29 people from IICT. I used to get calls recommending promotions but I never listened to anybody in my entire career. I believe scientists should be appointed on merit. I religiously followed reservations for lower posts, but not for scientific officers. Naturally, that became a parliamentary question. What did I gain personally by fighting on this issue? But, because of it, even today, IICT is a wonderful institution.

I was the only director who did not use the staff car for personal work. My wife didn't touch the official car and if I did use it for sight seeing, I always paid for it. Once a director even told me that that by paying, I was suggesting that everybody else who didn't, was corrupt. As I said, my income tax payment was more than my salary because of earnings from my lectures. Because of my attitude, many people used to say, 'when he retires, he will have to come to us for grants'. Everybody wants to be called a 'distinguished scientist', but once you retire, in our country, distinguished becomes extinguished. Once a person loses his chair, he loses all his power.

So I decided to go on my own.

ML: There was a CBI inquiry against you as well.

AVR: That was instigated by a minister who I did not

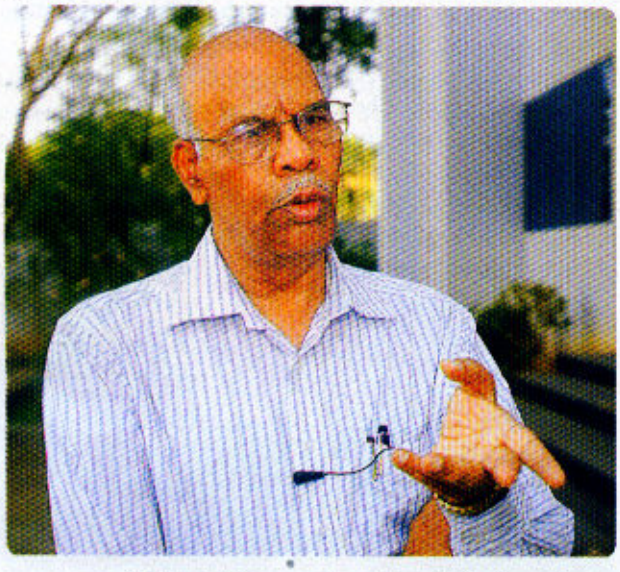


> "If someone is doing something wrong, I don't keep quiet. Also, I fight for the right. None of my fights was for my personal benefit. When I came to IICT, there were unions and I had to remove the troublemakers, which meant fighting the politicians"

listen to. Once I retired, they told the CBI that I was living beyond my means and had me raided. I wasn't perturbed. They took my passport and my wife's gold. I demanded it back by showing them all my earnings and papers. I got it back on the third day. The officers told me, "we know you, but we were helpless". It was the first time I realised to what extent politicians would go and how weak the CBI is. It was too much. All our earnings were reported; but they chose to attack me after retirement. This is happening to Mashelkar now, but not to the extent it happened to me.

ML: Tell us about AVRA Labs, India's first independent scientific research lab as a business venture.

AVR: Most scientists work as consultants and we think we know everything on earth. Then why beg the government for a post-retirement fellowship? It lasts only for five years, and although your successor treats you well initially, you soon begin to be treated very badly. I have personally seen it happen to several of my seniors.



> "After retirement, when I lectured at GD Searle, USA, they wanted me to do a project. I did not even have a lab then. They asked how much I wanted and I said $200,000. The deal was signed even without a letter head, on a blank sheet. By the time I returned, the money was here"

I was also offered these assignments. I refused. But when I consulted them on doing something on my own, everybody discouraged me. Then I spoke to Prof MM Sharma. He said, "Rama Rao, you are the best guy; you can do it on your own". When I told him that everybody had discouraged me, he said 'forget about them; you can do it'. He said, "Even I get scared and prefer to work as a consultant". I must tell you, he is the only man in the country I respect so highly. He stands for the truth and will also speak out for what is right.

ML: Did you work as a consultant after leaving IICT or did you start AVRA immediately?

AVR: Yes, immediately. I went on a lecture tour. When I lectured at GD Searle, USA, they were so impressed with work I had done on vancomycin that they wanted to sponsor a project at IICT. I told them that I had already retired. They asked me about my plans. I said, I planned to work independently. They said, "Why don't we sponsor you". I said, "I don't have any laboratory as yet, but I have a shed, will you pay for it"? They agreed. I asked them what the project was. Searle executives were working on a project but were not satisfied with it, because there was a nasty chemical which was the by-product. They said: "We have a solution but we won't tell you about it; we want you to find your own solution". I agreed, but said I needed some money. It was all very causal. They asked how much I wanted and I said $200,000. The deal was signed even without a letterhead, on a blank sheet. The name Avra Labs had been registered by then and, by the time I returned, the money was here. Then I went to address the Gordon Conference. It is a rare honour for an outsider to be invited there. I was invited twice. After my lecture, one of the executives of CytoMed asked me whether I would like to work on a project. I said, yes. He asked if I would come along to meet his CEO. They wanted 100 gm of a certain molecule and asked how much I would charge for it. I asked for $50,000. They agreed and gave me the money upfront. They had given the same project to a US company for $400,000 as well as to a British company; both had failed. They wanted to take a chance with me, because the molecule had gone through Phase I of testing but they couldn't get more than one gram of it. They were desperate for a breakthrough and we made a success of it. These two offers got me started. This is probably the only company that is built with zero investment -- everything is earned and ploughed back. We got some help from DM Neterwala, chairman of Dai-Ichi Karkaria, who promised to build the foundation for me, free of charge. I was surprised; even Dr Hamied was sceptical. But Neterwala gave me a shed and also built a building for me. When it was ready, he wanted me to become the managing director. I refused and then moved out. We have been lucky in getting a series of projects. We have worked with Pfizer, BMS, Astra Zeneca -- in fact, you name any big company and we have worked with them. Our work is essentially doing scientific research and being paid for it. Now we are getting into manufacturing outsourcing in a new factory near Vizag. Meanwhile, my son, who has a PhD from Cambridge, has also joined me.

Another thing we have done is work on anti-cancer drugs that are not being made. For the first time in the world, we have introduced a totally synthetic product to make a cancer drug intermediate. We have signed with a European company to supply the compound.

That was a significant breakthrough.